Session B Brief-out

- Addressed
  - VHF Systems Optimization
  - Terminal Area Communications
- 27 attendees
  - Significant comments from Mitre, SITA, PMEI, Northrop Grumman
- Facilitators: Tom Mulkerin & Mike Zernic

Session B Brief-out Agenda

- VHF Systems Optimization
  - Problem Statement
  - Products
  - FY04 Subproject Approach
- Terminal Area Communications
  - Problem Statement
  - Products
  - Subproject Approach
- Parking Lot Topics

VHF Systems Optimization
Problem Statement

Initial Problem Statement

- Limited VHF communications system capacity and increasing air traffic results in congestion of the aviation VHF spectrum. The resulting voice communication errors and delayed channel access create system congestion and air traffic delays.

Comments on Problem Statement

- The word “resulting” should be deleted. Second sentence is not dependent upon the first.
- Additional applications may impose more demand for VHF frequencies. For example, WAAS may generate a demand for AWOS.
- Regulatory subdivision of bands for specific functions limits flexibility in frequency usage.

VHF Systems Optimization Products

Initial Products

Technologies to improve efficiency of the VHF communication spectrum

- VHF antennas
- Technologies to reduce frequency guard band requirements
- Dynamic geographic frequency allocation
- VDL-3 system performance characterization

Comments on Products

- Add the following
  - VDL-2 system performance characterization
  - Technologies that optimize VHF link
- Cost to end user should be taken into consideration.
- Radio front end may also need to be analyzed.
- Further research in the area of signal mask and filtering requirements to reduce guard bands.
- Dynamic frequency allocation should be synchronized with ATS plans for dynamic resectorization.
- Address the policy constraints on VHF band allocation.

VHF Systems Optimization
FY04 Subproject Approach

Initial Approach

Perform technology assessment and refine concepts to down-select near term candidate technologies for further development and demonstration

Comments on Approach

- Before performing initial approach statement above,
  - Assess and scope the problem
  - Quantify VHF spectrum capacity, congestion and interference issues in VHF band.
  - Consider technology insertion windows of opportunity.
  - Parametric analysis for guard band is needed to evaluate the benefit and compare that to the real need of reducing frequency congestion.
- Identify high payback candidate solutions.
- Consider both voice and data
- Assessment should consider multiple antenna subsystem vs reconfigurable antenna subsystem

Terminal Area Communications Problem Statement

Initial Problem Statement

- Demand for digital air/ground (A/G) communications in the terminal area will continue to increase rapidly due to:
  - Increases in air traffic density
  - Advanced terminal area automation systems
  - Implementation of self-separation techniques
- Long range NAS operational concepts indicate a need for wideband terminal area communications that present and emerging A/G systems cannot meet.

Comments on Problem Statement

- Remove “digital” as it infers as solution.
- Implementation of self separation techniques as a driver of increase in demand of bandwidth requirement is questionable.

Terminal Area Communications Products

Initial Products

Next Generation Terminal Area Communications System Definition

- Requirements & Technology Assessment
  - Determine communications requirements
  - Identify candidate technologies and technology gaps
- Initial System Feasibility Evaluation
  - Develop component, system proof-of-concept models
  - Proof of concept feasibility demonstration and evaluation of candidate technologies

Comments on Products

- Assess various operational and procedural concepts that are forecast for the 2015 – 2025 timeframe. Then, translate CONOPS to system requirements.
- Communications requirements analysis should consider security needs.
- The magnitude of the communications capacity increase should be determined. (Is a quantum increase in capacity needed?)
- Alternative modulation techniques and waveform designs should be considered.

Terminal Area Communications Subproject Approach

- FY04:
  - Validate the problem statement as part of the requirements analysis.
  - Security needs should be addressed in the solution.
- FY06 – 08
  - Replace references to prototypes and field demonstrations with proof-of-concept models.
- FY07- 08
  - Build breadboard of key components.

Parking Lot Topics

- Scalability, flexibility and cost should be considered for all the solutions, test and demos.
- Identify all relevant stakeholders and incorporate their inputs. For example, Terminal Area Operations Aviation Rulemaking Committee (TAOARC) is a stakeholder. Inputs desired on changes in utilization of human resources.
- Test and demonstration of applications should occur in a system context.
- End user inputs should be included in test and demo definitions and executions.

Parking Lot Topics

- Europe investigating SATCOM and UMTS for use in the terminal area as a solution to future capacity problems.
- Frequency spectrum allocation would have to be coordinated with ITU through the WRC.
- Allow C, N and S functions to be in the same frequency band while maintaining required safeguards.
- Voice recognition technologies should be investigated to reduce the voice communications errors.

Priority From Break Out Area

It's 2009, the NExTNAS-CNS Project has spent its budget and has delivered key transitions/enabling breakthroughs toward an ATM transformation because it has successfully "_____"

- Belief that the identified technologies would help ensure VHF Communication is not the limiting factor in ATM operation.
- Industry acceptance of the NASA technology for commercial production.
- Technical and regulatory communities acceptance of the proposed solutions.

Priority For NExTNAS

It's 2009, the NExTNAS-CNS Project has spent its budget and has delivered key transitions/enabling breakthroughs toward an ATM transformation because it has successfully "_____"

- Industry acceptance of the proposed technologies for product development.
- NASA efforts considered successful by key government decision makers and aviation community such that follow on research is funded.
- Technical and regulatory communities acceptance of the proposed solutions.